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AUTHOR Bettini, Lorraine M.; Robinson, James D.
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ABSTRACT

A study was conducted to test the relationship between communication apprehension (CA) and learning. Subjects were 194 college students at a midwestern university enrolled in an introductory speech course who were divided by scores on the Personal Report of Communication Apprehension (PRCA). The groups heard a class presentation and were then tested in one of the two controlled ways, oral exam or objective test. Results indicated that high apprehensives scored higher on the objective test than on the oral exam, while scores on the objective test did not differ by CA level. In addition, the researchers found a small negative correlation between communication apprehension and learning in the test method condition. Evidence in the CA-learning relationship can easily be seen to affect the classroom setting, both in the planning and evaluation phases of education. (Two tables of data are included. Forty-eight references and two appendixes containing the PRCA and the objective test are attached.) (Author/MG)

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Communication Apprehension and Learning:

The Effects of Tension on Cognitive Development

Lorraine M. Bettini, M.A.
Department of Communication
University of Dayton
Dayton, Ohio 45469
(513) 229-2028

James D. Robinson, Ph.D.
Department of Communication
University of Dayton
Dayton, Ohio 45469
(513) 229-2340

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Abstract

The present study is designed to test the relationship between communication apprehension (CA) and learning. Subjects were 194 students in an introductory course who were divided by scores on the Personal Report of Communication Apprehension (PRCA). The groups heard a class presentation and were then tested in one of the two controlled ways. The instrument (PRCA) and the experimental conditions were found to be reliable and valid in the pilot study. Results indicate that high apprehensives scored higher on the objective test than on the oral exam, while scores on the objective test did not differ by CA level. In addition, the researchers found a small negative correlation between communication apprehension and learning in the oral test method condition.

Communication apprehension and learning: The effects of tension on cognitive development

Communication apprehension (CA), defined as "an individual's level of fear or anxiety associated with either real or anticipated (oral) communication with another person or persons" (McCroskey, 1977b, p. 78), has been the subject of numerous studies in the field of communication in the past 25 years. In an attempt to clarify its definition, many typological distinctions have been proposed. Among the most popular are reticence (Phillips, 1980), unwillingness to communicate (Burgoon, 1976), shyness (Zimbardo, 1977), and audience anxiety (Buss, 1980). For the purposes of the present study, however, the broadest definition will be employed, as each type of communication apprehension, regardless of causality, is behaviorally indistinguishable from the rest (Kelly, 1982).

The literature regarding the various effects of communication apprehension is abundant. Much empirical evidence exists linking CA with, for instance, particular nonverbal behavior styles (McCroskey, 1976; Burgoon & Koper, 1984), distinct dating patterns (Parks, Dindia, Adams, Berlin, & Larson, 1980), differences in small group interaction (Burgoon, 1977), amounts of self disclosure (McCroskey & Richmond, 1977), and reports of loneliness (Downs, Javidi, Nussbaum, & Robinson, 1987; Zakahi & Divan, 1982). Most of this research, however, is concerned with

the effects of a person's communication apprehension on his or her communicative relationships with others, rather than with the effects of CA on psychological development or intrapersonal communication.

The necessity and importance of communication skills can hardly be disputed. It is obvious that we must communicate orally with others in daily life. Likewise, the importance of communication in the educational system is taken for granted. The contemporary emphasis on personalized education is coupled with the implied emphasis on the student's interpersonal and public speaking skills. The student is frequently expected to orally express him- or herself and his or her educational needs. It is only by this communication on the student's part that the learning process can be evidenced. If this educational logic is employed, it would be reasonable to assert that communication apprehension must have an effect on the learning process.

Cognitive development researchers suggest several methods to help achieve maximum learning potential. For example, most agree that learning is facilitated, and that information is retained longer and more accurately, when the information to be learned is meaningful (Catania, 1979). Also, it is suggested that the learning process is accelerated in intentional rather than incidental situations (Catania, 1979). Some controversy exists, however, in linking tension to learning. From her review of the

anxiety/learning research, Highland (1981) has concluded that moderate levels of anxiety can enhance problem solving ability. Much of the "classic" literature suggests that there is an optimal level of tension that a person must experience in order to achieve his or her learning potential. Too much tension or anxiety will inhibit one's ability to learn, as will the existence of too little tension (Spielberger, 1966). In addition, Easterbrook (1959) maintains that increased tension produces an increase in the student's motivation to do well, which should ultimately lead to higher levels of cognitive development.

The definition of communication apprehension, as mentioned above, includes the concept of fear or anxiety in a specialized context. Since CA is consistent with the notion of tension or anxiety in the learning literature, the possibility of a relationship between CA and learning cannot be overlooked.

While the role of tension has been addressed in the learning theory literature, the relationship between communication apprehension and cognitive learning has not been empirically tested nor evidenced conclusively. Giffin and Gilham (1971) suggest a negative correlation between public speaking anxiety and motivation to achieve success. This difference in motivational orientation might, then, predict lower levels of achievement in those with high levels of CA.

Howarth and Eysenck (1968) found that extroverts, as

measured by the Eysenck Personality Inventory, performed better at short-interval paired-associates recall tasks than did introverts. This study would seem to suggest that extroverted individuals, i.e., those with low levels of communication apprehension, have a greater capacity to learn quickly than do introverts. This difference is explained by the proposal that extroverts have higher arousal thresholds (Eysenck & Howarth, 1968), thereby increasing performance levels. If this performance is synonymous with learning, it might be concluded that severe CA will inhibit the learning process.

McCroskey and Andersen (1976) found that high communication apprehensives did not achieve as highly at the college level as low CAs. By correlating scores on the Personal Report of Communication Apprehension (PRCA) with ACT scores and college grade point averages, they concluded that students who are most likely to avoid communication with the instructor are poorer academic performers than those who are likely to seek this communication. Since poorer academic achievement may be linked to less learning, CA may also be said to inhibit learning. In a related study, Scott and Wheeless (1977) found this same lower level of classroom achievement among high communication apprehensives. Students who had high levels of oral CA also performed less adequately, as measured by test and project grades in a lecture/lab class, than those with low CA. McCroskey (1977a) suggests that this lower achievement may

occur because of teachers' higher expectations for low CAs, because of poorer attitudes toward school among high CAs, or because of the tendency for high CAs to withdraw from classroom activity, thereby inhibiting their opportunities to learn.

Perhaps the most recent evidence in the CA-learning relationship is found in McCroskey and Payne (1984), in their attempt to replicate and expand an earlier study (McCroskey & Andersen, 1976). McCroskey and Payne report the first two years' results of a five-year study relating CA to student achievement in college students. For the four consecutive semesters investigated, G.P.A.s of high communication apprehensives were consistently significantly lower than those of low CAs. The data from the five-year longitudinal study have not yet been published, although the first two years' have led to the conclusion that communication apprehension results in low levels of learning.

The communication literature suggests a negative linear relationship between CA and learning, although this conclusion has never been empirically tested in a controlled experimental setting. Most of the research has centered upon measures that imply learning, i.e., standardized test scores and grade point averages may not necessarily reflect cognitive development but may be more indicative of uncontrolled situational variables. The learning literature, on the other hand, suggests that a certain level

of anxiety is optimal for maximum cognitive development. Communication apprehension at "optimal" levels, then, may not be detrimental to the learning process, but may actually be beneficial. Situations which enhance CA to its maximum level, however, may serve to undermine the learning process. Similarly, situations which do not escalate CA levels should not produce learning differences between those with high CA and those with low CA.

The present study is designed to empirically test the relationship between tension, as measured by communication apprehension, on cognitive development, by way of two testing methods. A 2 x 3 factorial design (2 testing methods x 3 levels of CA) will examine the CA/learning relationship in a controlled setting. Based on the above review of the literature, an interaction between levels of communication apprehension and testing method is predicted, such that:

H_1: There will be a curvilinear relationship between communication apprehension and learning under the oral testing condition

H_2: Subjects with high CA will score significantly higher on the objective test than on the oral test

H_3: No significant difference between objective test scores will be found among the levels of CA

METHOD

Subjects

The participants in this experiment were 194 college students (approx. 33 per cell) enrolled in introductory Speech 101 classes at a mid-sized midwestern private university. Because of the required nature of the class, the students varied in age and in major area of study, yet were presumably demographically homogeneous. They were not made aware of the experimental conditions.

Procedure

The respondents were administered the Personal Report of Communication Apprehension (McCroskey & Richmond, 1980) which was embellished with several demographic questions (copy included in Appendix A). It should be noted that the PRCA was completed by the subjects no more than 10 days before actual data collection, as Porter (1979) suggests a temporary validity of the measure.

The students were divided into the three experimental groups, two of each condition (high CA, moderate CA, and low CA) based upon their scores on the measure. Those who scored at least one standard deviation above the mean were considered high CAs, those who scored at least one standard deviation below the mean were labelled low CAs, and those who scored within one standard deviation above or below the mean were considered moderate CAs. The groups were then

randomly assigned to two testing methods (oral exam or objective test), each of the CA conditions being represented in each testing condition.

Subjects were assembled in their respective conditions, told that a class lecture would be delivered via audio tape, and told that they would be tested on the content of the presentation in one of the two controlled ways. They were also told that this 10-item test would constitute a class grade.

The same 25-minute taped lecture was then presented to each of the groups separately, with material designed to be consistent with the objectives of the class. The content included college-level material with average vocabulary (actually extracted from an introductory text), thus the material to be learned was meaningful and the situation intentional. Immediately following the lecture, the objective tests were administered to half of the groups, with the number correct serving as the measure of learning. In the other groups, each student was individually taken to an unfamiliar class assembly in order to orally report in front of it. The experimenter, seated in the class audience, asked the students, one at a time, open-ended factual questions about the lecture that corresponded with the objective test questions. The student's accuracy as he or she reported the answers in front of the audience was recorded and served as the dependent measure.

After each person was tested, the participants were

debriefed and assured that their grade would not be counted. The collected data were then analyzed via the University's SPSS program. In light of the predicted relationships, the interaction was thoroughly analyzed. A planned quadratic trend analysis was run on the data collected from the oral test condition. In addition, the planned comparisons (as stated in the hypotheses) were conducted utilizing the Modified Bonferroni method to control for familywise error (see Keppel, 1982).

PILOT STUDY

In an effort to pretest the critical portions of the previous procedure, parts of this method were examined via a scaled-down pretrial of the experiment. This pilot study took place approximately one month before the actual one, and was designed to test the logistics and practicality of the overall design. Specifically, this pretest attempted to assess the reliability of the PRCA, the difficulty of the material presented, and the proper challenge of the exam. In addition, the pilot served to determine the amount of time needed to complete the full-scale project.

Subjects

The participants (N=25) were selected from an upper level communication course. They were expected to be conceptually similar to those described above, as they were a segment of the same university.

Procedure

First, the PRCA-survey was administered, approximately 15 minutes before the experimental conditions were introduced. The class was not immediately divided, however, since only the objective testing method was being pretested. The subjects were given the proposed explanation, including the necessary "grade" stipulation to ensure participation.

The 25-minute audio tape, on the topic of persuasion, was played. Subjects were told to listen only, no note-taking nor discussion was permitted. At the completion of the tape, objective tests were distributed. Two versions of a 15-item test were randomly administered, each covering material from the lecture. From the test results, 10 final questions were salvaged and later served as the experimental exam.

PILOT RESULTS

PRCA

The Personal Report of Communication Apprehension proved to be reliable for the sample. The results of a split-half analysis yielded a reliability coefficient of .93, consistent with the results of McCroskey (1978).

Scores on the PRCA ranged from a low of 45 to a high of 94 (mean=69.8, standard deviation=16.4). When divided, these results suggest that this sample included 10 high CAs,

5 moderate CAs, and 10 low CAs. While the scores were not distributed exactly as expected, this distribution does add credence to McCroskey's (1978) assertion that people vary in the degree to which they fear oral communication.

Tests

The 15-item tests collectively provided enough information to conclude that the lecture was coherent, clear, and understandable for college students. The overall test mean was 9.2/15 (61%); the standard deviation was 2.5 (high=14, low=4). Scores on Test A were slightly higher (N=13, mean=9.6, sd=2.79, high=14, low=4), although the scores were not significantly different ($F_{(1,12)}$=1.47, p>.05) on Test B (N=12, mean=8.75, sd=2.22, high=13, low=6). Ten questions were taken from these tests collectively for the final project (copy included in Appendix B).

Hypotheses

While not enough data were gathered to pretest the statistical analyses of the actual study, several meaningful tests added to its rationale. The difficulty of the controlled test was assessed by correlating it with the class's midterm exam scores. The significant high correlation (r=.56, p=.003) suggests that scores on the study's test were indicative of normal class performance. In addition, the experimental test was no harder than what is typically expected from students.

To test the results of past studies (eg., McCroskey & Andersen, 1976; Scott & Wheeless, 1977; McCroskey & Payne, 1984) which suggest a strong negative linear relationship between CA and test scores, the sample's PRCA scores were correlated with the scores on each exam. The correlation coefficient (*r*) for the PRCA-midterm examination was -.08 (*p*=.68); for the PRCA-controlled test, *r*=.05 (*p*=.81). While the sample size was not large enough to assert the Null Hypothesis, the non-significant results do suggest that the CA-learning link warrants further investigation. Had the correlation results been significant, the rationale for this study could have justifiably been questioned.

The results of the pilot study provide a strong base on which to build the actual experiment. The usefulness of the PRCA has been established in its reliability and score distribution. The lecture and subsequent test have been critically and statistically assessed and found to be of the proper challenge for college students. Finally, the pilot results suggest that the CA/learning relationship is one in need of further investigation.

RESULTS

Of the 194 subjects tested, 118 (60.8%) were males and 76 (39.2%) were females. The majority of subjects were freshman (73.2 %) or sophomores (17%), and all but 3% were full-time students. The primary colleges which were represented were Arts and Sciences (37.6%) and Engineering

(33%), with fewer students being Business and Education majors (24.7% and 4.6%, respectively).

With respect to the CA variable, the sample broke down into 64 low CAs (32.9%), 62 moderate CAs (31.9%), and 66 high CAs (34%). The oral testing method condition consisted of 92 subjects (47.5%), while 102 subjects (52.5%) were tested objectively.

An analysis of variance showed only one significant main effect for method ($F_{1,182}$= 127.88, p = .000, omega^2 = .39). No significant higher interactions were found.

Hypotheses

Hypothesis 2, predicting that high CAs would score significantly higher on the objective test than on the oral test, was strongly supported. Table 1 shows the means and standard deviations of this comparison, $t(64)$ = 7.03, p = .000, omega^2 = .42. The Modified Bonferroni procedure would suggest a significance level of .025, which was clearly met.

----------TABLE 1----------

Hypothesis 3 predicted that there would be no significant difference in scores among CA levels in the objective method condition. The data strongly support this prediction. Table 2 shows the means and standard deviations for each of the three groups in the objective test

condition. For the low CA versus moderate CA comparison, $t(99) = .29$, $p = .77$. For moderate versus high CA, $t(99) = .38$, $p = .71$. For the final comparison of low versus high CA, $t(99) = .68$, $p = .50$. Again utilizing the Modified Bonferroni method to assert the Null, the significance level would be .075 (.05 + .025). The data clearly meet this high standard.

----------TABLE 2----------

The first hypothesis predicted a curvilinear relationship between CA and learning in the oral testing condition. The data do not support this prediction, as the quadratic trend analysis was non-significant ($F_{1,89} = .0416$, $p = .8388$). Results do show, however, a small yet significant negative linear trend ($r = -.27$, $p = .008$, two-tailed), accounting for 7.29% of the variance.

DISCUSSION

Since the second and third hypotheses were strongly supported, we can assert, first of all, that the levels of communication apprehension have no differing effects on cognitive learning when measured by an objective test. Consistent with much of the cognitive learning literature, it seems that since subjects' CA was not enhanced in the objective test condition, there was no real relationship (or

at least no differing relationship), between communication apprehension and learning.

For subjects with high CA, learning was facilitated in the objective test condition, enabling high-CAs to perform as well as the lower-CA subjects. When high CAs were tested orally, however, their anxiety was elevated and they did not perform as well on a test of learning as high CAs in the objective test condition. Distinguishing between the two types of learning tests, then, is a salient feature in determining the CA-learning relationship. The 'blanket' suggestion that CA has a generally negative effect on learning, based on these data, is apparently a spurious one.

The data discounting the first hypothesis suggest that the anxiety-learning relationship is not as simple as we might think. The learning literature suggests that students who are highly anxious also tend to be highly motivated, expending a great deal of effort to achieve success. With this in mind, the results concerning the first hypothesis are particularly compelling.[1]

First of all, high levels of anxiety have been shown to improve performance on some types of learning tasks and be detrimental to other types of tasks. For example, simple and rote tasks (and likely any task performance that is improved upon by high levels of persistence) are often facilitated by anxiety. Conversely, novel tasks and/or tasks that require a great deal of improvisational thinking are not performed well by highly anxious individuals (e.g., Caron, 1963; McGuigan, Calvin, & McCandless, 1956; Russell &

Sarason, 1965; Stevenson & Odom, 1965). In fact, there is evidence that anxiety actually improves performance on complex tasks when the task is not particularly novel, significant, or threatening to self esteem (e.g., Van Busrirk, 1961; Wittrock & Husek, 1962), when the level of anxiety is moderate and not too extreme (e.g., Suinn, 1965), or when the anxious individual has a sufficient coping mechanism for dealing with his/her anxiety (Suinn, 1965).

As Ausubel, Schiff, & Goldman (1953) point out, practice seems to mitigate the differences in the highly anxious and their less anxious counterparts. Once the speech-making (or oral test) activity becomes routine and familiar, then, the activity is no longer novel, threatening to the self-concept, or requiring improvisational behavior. In fact, practice on easier but related tasks and practice on the target task has been shown to help the highly anxious more than their less anxious counterparts (Ausubel, Schiff, & Goldman, 1953). In general, high levels of anxiety have a significant negative effect on elementary school achievement (e.g., Cowen, Zax, Klein, Izzo, & Trost, 1965; Lunneborg, 1964; Sarason, Hill, & Zimbardo, 1964), but that changes by the time the student completes high school. In high school the student typically copes with his/her anxiety by being highly motivated and the tasks are no longer novel (Sarason, 1961; 1963; Walter, Denzler, & Sarason, 1964). This trend continues through college (Alpert & Haber, 1960; Grooms & Endler, 1960; Spielberger & Katzenmeyer, 1959). In fact, McCroskey and his colleagues (McCroskey, Booth-Butterfield,

& Payne, 1988) provide recent evidence that CA has its strongest impact during the first two years of a student's college career. They suggest that high CAs who remain in college may develop coping mechanisms to deal with this communicative anxiety and enable them to succeed. In contrast to much of the CA literature, however, some of the learning literature suggests that high anxiety levels in college students is actually predictive of academic achievement (e.g., Lundin & Sawyer, 1965), particularly amongst academically superior students (Spielberger, 1962).

Secondly, the type of anxiety enhanced needs to be considered. There seems to be a distinction between normal and neurotic anxiety in the clinical psychology literature. The boundary line between normal or "healthy" anxiety and abnormal or "neurotic" anxiety, however, is often obscure. An environmental condition can trigger a neurotic anxiety reaction in someone with a related personality disposition (Martin, 1971). In other words, the oral testing condition may have been "traumatic" enough to trigger a neurotic reaction in high CAs. Similarly, Lesse (1970) notes that what initially begins as healthy anxiety may gain momentum and finally reach a point at which realistic defense mechanisms break down. This final point renders a person dysfunctional. The unfamiliarity of the experimental class setting, the novelty of the material to be learned, and the disposition toward fear of speaking in public may have combined to produce a neurotic anxiety reaction in high CAs. This reaction could

have precluded, not necessarily learning, but performance. High CAs may have learned as much as their lower CA counterparts, but may not be able to provide evidence of that learning. This would explain the negative correlation between CA and learning in the oral test condition.

The results, though mixed, clearly indicate several things. First of all, the communication apprehension-learning relationship is not as simple as we might like to think. There are many intervening variables in this relationship that need to be considered. Secondly, the potential CA-learning link is one that is in need of further research. A long-term research program will uncover more dynamics in this area. Finally, practical implications to this line of research are intuitive. Evidence in the CA-learning relationship can easily be seen to affect the classroom setting, both in the planning and evaluation phases of education.

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Notes

1. We conducted a post-hoc correlation on the PRCA and Spielberger's Test Anxiety Scale (TAS) since a high positive correlation between the two measures could have explained the lack of support for the first hypothesis. Contrary to our expectations, however, the two measures were negatively correlated ($N = 50$, $r = -.40$, $p = .002$). If our data are representative, the anxiety produced by an impending test is not highly related to the anxiety experienced in relation to public speaking.

Appendix A

ID Number: _____

Please indicate your gender: _____ (1=male; 2=female)

Please indicate your year: _____ (1=freshman, 2=sophomore, 3=junior, 4=senior)

Please indicate your college: _____ (1=A&S, 2=Business, 3=Engineering, 4=Education)

Please indicate your academic status: _____ (1=full-time; 2=part-time)

****

The following instrument is composed of twenty-five statements concerning feelings about communicating with other people. Please indicate the degree to which each statement applies to you by marking whether you (1) strongly agree, (2) agree, (3) are undecided, (4) disagree, or (5) strongly disagree. Please just record your first impression.

___ 1. While participating in a conversation with a new acquaintance I feel very nervous.

___ 2. I have no fear of facing an audience.

___ 3. I talk less because I'm shy.

___ 4. I look forward to expressing opinions in class.

___ 5. I am afraid to express myself in a group.

___ 6. I look forward to an opportunity to express myself in a group.

___ 7. I find the prospect of speaking mildly pleasant.

___ 8. When communicating, my posture seems strained and unnatural.

___ 9. I am tense and nervous while participating in group discussions.

___10. Although I talk fluently with friends, I am at a loss for words on the platform.

___11. I have no fear about expressing myself in a group.

___12. My hands tremble when I try to handle objects on a platform.

___13. I always avoid speaking in public if possible.

___14. I feel more fluent when talking to people than most other people do.

___15. I am fearful and tense all the while I am speaking before an audience.

___16. My thoughts become confused and jumbled when I speak before an audience.

___17. I like to get involved in group discussions.

___18. Although I am nervous just before getting up, I soon forget my fears and enjoy the experience.

___19. Conversing with people who hold positions of authority causes me to be fearful and tense.

___20. I dislike to use my body and voice expressively.

___21. I feel relaxed and comfortable while speaking.

___22. I feel self-conscious when I am called upon to answer a question or give an opinion in class.

___23. I face the prospect of making a speech with complete confidence.

___24. I'm afraid to speak up in conversations.

___25. I would enjoy presenting a speech on a local TV show.

Appendix B

ID Number: _____

Please complete the following multiple choice:

_____ 1) Ethos, logos, & pathos are reasoning devices labelled by:

A. Socrates
B. Thoreau
C. Plato
D. Aristotle

_____ 2) "Bank robbers are like a disease that must be treated to keep it from spreading" is an example of:

A. induction
B. character
C. evasion of argument
D. figurative analogy

_____ 3) "Because Socrates is a man, he is mortal" is an example of a compressed version of a syllogism called:

A. analogy
B. fallacy
C. enthymeme
D. induction

_____ 4) An argument made up of 2 premises (a major premise & a minor premise) is called a(n):

A. non sequitur
B. syllogism
C. induction
D. analogy

_____ 5) "It is snowing outside, therefore it must be winter" is a classic example of:

A. sign reasoning
B. causal reasoning
C. deductive reasoning
D. evasive reasoning

Please complete the following sentences:

6) _____ is the act of motivating someone, through communication, to change a belief, attitude, or behavior.

7) _____ refers to the believability of the speaker.

8) _____ refers to the speaker's expertise on the topic.

9) _____ is a combination of a speaker's enthusiasm and likeability.

10) The speaker is perceived as having _____ if the audience trusts him/her enough to believe what he/she is saying.

TABLE 1

Level = High CA

	Method	
	OBJECTIVE	ORAL
N	35	31
$\bar{X}$	5.97	2.85
sd	1.87	1.71

TABLE 2

Method = Objective Test

	LEVEL		
	LOW CA	MOD CA	HIGH CA
N	34	33	35
$\bar{X}$	6.26	6.14	5.97
sd	1.58	1.94	1.87